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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/449,250	11/24/1999	MI-SUEN LEE	PHA-23-859	6048

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EXAMINER

KIM, CHONG R

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 04/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. 09/449,250	Applicant(s) LEE, MI-SUEN	
Examiner Charles Kim	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 November 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed January 31, 2003, has been entered and made of record.
2. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5, 9-13, 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Courtney (U.S. Patent No. 5,969,755), and Abe (U.S. Patent No. 5,134,472).

Referring to claim 1, Courtney discloses a method for detecting an object of interest in an image processing system, the method comprising the steps of:

- a. generating a difference image (col. 6, lines 22-25)
- b. segmenting the difference image into a plurality of regions (col. 6, lines 27-31 and figure 7f)

- c. identifying one or more silhouette candidates in at least a subset of the regions (col. 7, lines 52-60 and figure 7f. Note that the “shape mask” in line 59 is interpreted as being analogous to a silhouette candidate)
- d. detecting the object of interest based at least in part on the identified silhouettes (col. 7, lines 61-67).

Courtney fails to teach that the difference image is segmented into a plurality of regions such that each of the regions are bounded by one or more lines passing through the entire image.

However, segmenting images into a plurality of regions that are bounded by one or more lines passing through the entire image was exceedingly well known in the art. For example, Abe teaches an (window) image that is divided into vertical segments (stripes) that are bounded by lines passing through the entire image (col. 10, lines 66-col. 11, line 2 and figure 11).

Courtney and Abe are both concerned with detecting a moving object of interest. Abe’s method detects the entire image of a moving object while avoiding erroneous measurements (Abe, col. 1, lines 47-52). Abe also teaches that the image is divided into a plurality of regions in order to identify silhouette candidates (edge image) in the subset of regions; wherein the identified silhouette candidates are utilized to detect the object of interest (Abe, col. 11, lines 3-20). Therefore, it would have been obvious to modify the segmentation step of Courtney, so that the difference image is segmented into a plurality of regions that are bounded by one or more lines passing through the entire image, as taught by Abe.

Referring to claim 2, Courtney further discloses that the object of interest is a moving person (figure 4).

Referring to claim 3, Courtney further discloses that the difference image comprises a thresholded difference image generated by taking a difference between a first image and a second image and applying binary thresholding to the resulting difference (col. 5, lines 64-67).

Referring to claim 4, see the rejection of at least claim 1 above. Courtney fails to teach that the difference image is segmented into a plurality of regions such that each of the regions are bounded by one or more vertical lines passing through the entire image.

Abe teaches an image that is segmented into a plurality of regions bounded by one or more vertical lines passing through the entire image (figure 11). Therefore, it would have been obvious to modify the segmentation step of Courtney, so that the image is segmented into a plurality of regions that are bounded by one or more vertical lines passing through the entire image as taught by Abe, for the reasons disclosed above.

Referring to claim 5, Courtney further discloses that the regions of the image which includes a silhouette candidate includes only a single silhouette candidate (figure 7f).

Referring to claim 9, see the rejection of at least claim 1 above. Courtney further discloses a camera (element 11 in figure 1).

Referring to claim 10, see the rejection of at least claim 2 above.

Referring to claim 11, see the rejection of at least claim 3 above.

Referring to claim 12, see the rejection of at least claim 4 above.

Referring to claim 13, see the rejection of at least claim 5 above.

Referring to claim 18, Courtney further discloses that the image processing system comprises a video surveillance system (col. 2, lines 29-34).

Referring to claim 19, Courtney further discloses that the image processing system comprises a human-machine interface (element 28 in figure 5).

Referring to claim 20, see the rejection of claim 1 above.

4. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Courtney (U.S. Patent No. 5,969,755) and Abe (U.S. Patent No. 5,134,472), further in view of the article entitled "Grouping \cdot , \rightarrow , into Regions, Curves, and Junctions" by Lee et al. ("Lee").

Referring to claim 6, Courtney and Abe fail to disclose the step of determining saliency values for each of the silhouette candidates using tensor voting.

Lee teaches the determination of saliency values using tensor voting (pages 55-56 under the section labeled "TENSORIAL FRAMEWORK FOR SALIENT STRUCTION INFERENCE").

Therefore, since Lee teaches that the saliency values allows for the identification of features such as points or curve elements (page 57), it would have been obvious to determine the saliency values for each of the silhouette candidates of Courtney of Abe, by the tensor voting method of Lee, since the silhouette candidates are characterized by curve elements (Courtney, col. 7, line 59 and figure 7f), and the determination of the saliency values for each of the silhouette candidates would result in the identification of the curve element features. Furthermore, one would be motivated to incorporate the tensor voting method of Lee, since it efficiently collects information in a large neighborhood containing any combination of points, curve elements, or surface patch elements, which would allow for the interpolation, discontinuity

detection, and outlier identification of the silhouette candidate simultaneously (Lee, page 54, third paragraph under "INTRODUCTION").

Referring to claim 14, see the rejection of at least claim 6 above.

5. Claims 7, 8, 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Courtney (U.S. Patent No. 5,969,755) and Abe (U.S. Patent No. 5,134,472), further in view of Gibbon (E.P. Patent No. 0 635 983 A2).

Referring to claim 7, Courtney and Abe fail to disclose the step of detecting a neck position of the moving person.

Gibbon teaches the step of detecting a neck position of a moving person (figure 10) by analyzing a sum of x-components of tangents along a corresponding silhouette (page 5, lines 29-57. Note that the neck position is located at a "feature point", which is detected by determining the derivative along the corresponding silhouette (curve), and locating the significant zero crossings. It is further noted that this determination of the zero crossings of the derivative of the silhouette is analogous to analyzing a sum of x-components of tangents along the silhouette, since the tangent of a line is defined by the derivative of the line).

Courtney, Abe, and Gibbon are all concerned with the detection of a moving object by generating difference images. Gibbon provides an accurate method for determining the position and the size of the moving person's head (Gibbon, page 6, lines 16-17). Therefore, it would have been obvious to detect the neck position of the silhouette of Courtney and Abe, by the method taught by Gibbon.

Referring to claim 8, Gibbon further discloses that the detected neck position is utilized to determine the size and position of the moving person's head (page 6, lines 16-17).

Referring to claim 15, see the rejection of at least claim 7 above.

Referring to claim 16, see the rejection of at least claim 8 above.

Referring to claim 17, Courtney and Abe fail to explicitly state that the image processing system comprises a video conferencing system. However, Gibbon teaches that the image processing system comprises a video conferencing system (page 3, lines 3-4. Note that "visual communication" in line 4 is interpreted as being analogous to video conferencing).

Therefore, since Courtney, Abe, and Gibbon are all concerned with detecting a moving object, as disclosed above, it would have been obvious to include the video conferencing system of Gibbon, in the image processing system of Courtney and Abe.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Ponticos U.S. Patent No. 6,035,067 discloses a method for tracking objects in video sequences by segmenting a difference image.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Monday thru Thursday 8:30am to 6:00pm and alternating Fridays 9:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

ck
ck
March 26, 2003

Jon Chang
Jon Chang
Primary Examiner

